

**POSTER SESSION**

**1049 ST Elevation Acute Myocardial Infarction**

Sunday, March 30, 2003, 3:00 p.m.-5:00 p.m.
McCormick Place, Hall A

Presentation Hour: 3:00 p.m.-4:00 p.m.

**Abstract Title:** Enhanced Oxidant Stress After Reperfusion is Associated With Persistent ST Elevation Despite Infarct-Related Artery in Acute Myocardial Infarction

**Authors:** Tsuchiya, N., Hanamura, Y., Kitahori, K., Yamanaka, K., Murozumi, M., Hayashi, H., Fujii, K., Watanabe, S., Hiramoto, N., Hanibuchi, N., Hayashi, N., Fujii, K., Watanabe, S., Osaka, Hyogo, Japan

**Background:** The urinary excretion of 8-iso-prostaglandin F2alpha (8-iso-PGF2alpha), a marker for in vivo oxidant stress, is increased during reperfusion in acute myocardial infarction (AMI). Interestingly, 8-iso-PGF2alpha is also a vasocorstructor, a platelet activator, and a regulator of leukocyte-endothelial interaction. The generation of 8-iso-PGF2alpha from the AMI heart, thereby may contribute to poor microvascular blood flow through neutrophil plugging and vasoconstriction. No resolution of ST segment elevation despite patent epicardial coronary artery may reflect poor microvascular refill. Hence we hypothesized that enhanced oxidant stress after reperfusion is associated with persistent ST elevation despite patent infarct-related artery (IRA).

**Methods:** Twenty-six patients with successfully reperfused AMI by direct angioplasty were studied. Urinary 8-iso-PGF2alpha excretions were measured in the spot samples before reperfusion, the collection of the first 6 hours after it, and the spot samples in the chronic phase. The degree of enhanced oxidant stress following reperfusion was evaluated with delta urinary 8-iso-PGF2alpha defined as subtraction of its urinary excretion in the chronic phase from that in the 6 hours after reperfusion. The patients were divided into two groups based on delta urinary 8-iso-PGF2alpha, i.e. patients with enhanced oxidant stress after reperfusion and patients without it; a cut-off point of delta urinary 8-iso-PGF2alpha was based on delta urinary 8-iso-PGF2alpha defined as subtraction of its urinary excretion in the chronic phase from that in the 6 hours after reperfusion. The patients were divided into two groups based on delta urinary 8-iso-PGF2alpha, i.e. patients with enhanced oxidant stress after reperfusion and patients without it; a cut-off point of delta urinary 8-iso-PGF2alpha was based on delta urinary 8-iso-PGF2alpha defined as subtraction of its urinary excretion in the chronic phase from that in the 6 hours after reperfusion.

**Results:** Incomplete ST resolution (ΔST70%) despite patent IRA was more frequently observed in patients with enhanced oxidant stress than those without it (60% vs. 38%, p=0.02). The incidences of peri-cardial effusion (PE) and congestive heart failure (CHF) were higher in patients with enhanced oxidant stress than those without it (PE, 48% vs. 38%, p=0.02; CHF, 46% vs. 0%, p=0.007). Enhanced oxidant stress following reperfusion is associated with absence of ST resolution despite patent epicardial coronary artery and in-hospital complications.

**Conclusion:** Enhanced oxidant stress after reperfusion is associated with persistent ST elevation despite patent infarct-related artery (IRA).

**1049-107 Impact of Platelet Characteristics on Myocardial Tissue Reperfusion in Acute Myocardial Infarction**

**Authors:** Shogo Kawano, Hiroshi Ito, Katsunori Iwakura, Atsunori Okamura, Tatsushi Kuroda, Katsukiyo Asano, Koii Tanaka, Yusa Nishida, Yoshihiro Meekawa, Aiko Yano, Yoshinume Hiramoto, Noriyuki Hanabuchi, Norihito Hayashi, Kenshi Fuji, Sakunobu Watanabe, Hospital, Osaka, Japan

**Background:** Previous studies have demonstrated that the microvascular embolization of intracoronary thrombus and plaque components reduces the benefit of reperfusion therapy for AMI. However, it is unknown whether the plaque burden of culprit lesion impacts the microvascular embolization and the tissue reperfusion. Methods: In 63 consecutive patients (pts) with AMI within 6 hours after symptom onset, we performed IVUS to evaluate the plaque characteristics after thrombectomy with Resolute™ PT catheter. All pts underwent the subsequent angioplasty with or without stenting after IVUS assessment. Myocardial tissue reperfusion was assessed based on TIMI perfusion grade (TMPG). Results: TIMI-3 flow was observed in 53 pts (64%) after thrombectomy alone and 65 pts (78%) after adjunctive angioplasty. There were 58 pts (38%) with TMPG-0 in final angiography. In a logistic regression model, RCA culprit was the strongest predictor of microvascular embolization and the tissue repedusion. lntracoronary thrombus removal is not enough to prevent microvascular embolization and the evaluation of plaque characteristics by IVUS is promising to determine the indication of distal protection strategy to maintain tissue reperfusion in AMI.

**1040-100 Angiographic Assessment of Reperfusion in Acute Myocardial Infarction by Myocardial Blush Grade**

**Authors:** Jose P. Henriquez, Felix Zijlstra, Arnonthi, Van't Hof, Menko-Jan de Boar, Jan-Henk E. Darmink, Marcel Gosselink, Jan C, Hoornje, Harry Suryapranata, Isala Klinieken, Locatie Wezenlanden, Zwolle, The Netherlands

**Background:** Anisochronous successful reperfusion in acute myocardial infarction has been defined as TIMI 3 flow. However, TIMI 3 flow does not always result in effective myocardial reperfusion. Myocardial Blush Grade (MBG) is an angiographic measure of myocardial perfusion. We hypothesized that optimal angiographic reperfusion is defined by TIMI 3 flow and MBG 2 or 3.

Methods: In 924 consecutive patients with TIMI 3 flow after angiography for acute myocardial infarction, we prospectively studied the value of MBG. Endpoints were death, MACE, enzymatic infarct size and residual left ventricular ejection fraction.

Results: Follow up was 16 ± 11 months. Of the 924 patients, 101 (99%) patients had MBG 2 or 3. Mortality was significantly higher in patients with MBG 0 or 1, compared with patients with MBG 2 or 3 (RR 7.9/0.92% vs. 7.9/0.8% p=0.01). The combined incidence of MACE was higher in patients MBG 0 or 1, compared to patients with MBG 2 or 3 (RR 1.8: 95%CI 1.2-2.6, p=0.009). Enzymatic infarct size was larger (1437±236 vs. 809±162, p<0.001) and left ventricular ejection fraction was lower (37.7±10.6 vs. 38.3±11.1, p<0.001) in patients with MBG 0 or 1, compared to patients with MBG 2 or 3.

Conclusions: MBG is a strong angiographic predictor of mortality in patients with TIMI 3 flow after angioplasty. Enzymatic infarct size is larger and residual left ventricular ejection fraction is lower in patients with MBG 0 or 1, compared with MBG 2 or 3. Angiographic definition of successful reperfusion should include both TIMI 3 flow as well as MBG 2 or 3.

**1049-109 Relationship Between Time to Treatment, Electrocardiographic ST-Segment Resolution, and Outcomes With Primary Percutaneous Coronary Intervention for Acute Myocardial Infarction: Results From the CADILLAC Trial**

**Authors:** Bruce R. Brodie, Bernard Gersh, Thomas D. Stuckey, Peter Zimetbaum, Michael G. LaMountain, Eiren D. Aydogan, Roxana Mehran, Bill O'Neill, James E. Tcheng, Mark Turco, David A. Cox, Cindy L. Grines, Gregg W. Stone, LeBasler Cardiovascular Research Foundation, Miami, FL, Larroche Cardiovascular Research Foundation, New York, NY

**Background:** ST-segment resolution (STR) is a measure of microvascular reperfusion in AMI and has been correlated with outcomes. The relationship between time to treatment, STR, and outcomes with primary PCI has not been studied.

**Methods:** The CADILLAC Trial enrolled pts with AMI <12 hrs without shock who were randomized to admit vs PTCA +/- eABMD (n=109). Baseline ECGs pre and post-PCI, with >1mm ST elevation pre-PCI adequate for interpretation were available in 700 pts. STR was measured at a core ECG lab as the percent resolution of summed ST elevation from pre to post-PCI. The relationship between time to treatment (10 min intervals), STR, and outcomes are shown in the IAB

**Results:** STR was classified as complete (>70%, n=436), partial (30-70%, n=193) or absent (<30%, n=93) or absent (<30%, n=93). STR (>70% vs 70% vs <30% correlated with one year mortality (4.2% vs 5.2% vs 9.9%, p<0.04) and re-infarction (0.7% vs 3.8% vs 1.5%, p=0.02). Time to reperfusion (RT <3 vs ≥3 hrs) also correlated with 1 yr mortality (2.5% vs 4.5%, p=0.04) and re-infarction (1.4% vs 2.8%, p=0.08). Late reperfusion was associated with a lower frequency of complete STR (47% vs 66%, p<0.0003). The relationship between RT, STR and outcomes are shown in the IAB.

Conclusions: RT and STR are co-dependent but both are important for optimal outcomes with primary PCI. Maximum survival benefit requires both early reperfusion and complete STR. These data stress the importance of reducing time delay and enhancing microvascular reperfusion in pts undergoing PCI for AMI.
Influence of Diabetes Mellitus on Intravenous Thrombolysis Effectiveness in Patients With ST Elevation Myocardial Infarction

Michael N. Zairis, Olga Papadaki, Stamatis Makrygiannis, Olga Ampartzidou, Pelagia Hospital, Piraeus, Greece

Background: Early resolution of ST-segment elevation is associated with enhanced clinical outcome following ST elevation myocardial infarction (STEMI). Despite the improvements in the management of type 2 diabetic patients with STEMl these patients have unfavorable prognosis. The present prospective study investigated the hypothesis that type 2 diabetic patients may have a delayed ST-segment recovery during administration of intravenous thrombolysis even though within the desirable margin.

Methods: The study cohort included 137 consecutive patients with STEMl. 105 were non-diabetic and 32 type 2 diabetic. All patients received thrombolysis in ≤6 hours from index pain and attained steady >50% ST-segment recovery within 90min. The course of ST-segment recovery was assessed utilizing continuous 12-lead electrocardiographic monitoring.

Results: The time required for ≥50% ST-segment steady resolution was significantly greater in type 2 diabetics (P<0.001). Additionally, although there was no difference in the incidence of TIMI 2 or 3 flow between the two groups, type 2 diabetics had significantly higher values of corrected TIMI frame count in the infarct-related arteries (P<0.001). Furthermore, a multivariate linear regression analysis diabetes mellitus was independently and positively related to the time to ≥50% ST-segment recovery (P<0.001).

Conclusions: This study implies that type 2 diabetic patients may have delayed recovery of ST-segment elevation even during successful thrombolysis.

The Clinical Significance of Circulating Levels of Granulocyte/Macrophage-Colony Stimulating Factor in Acute Myocardial Infarction Patients

Konstantinos L. Karelis, Christos E. Pitasos, Stamatis Kastelanos, Grigorios P. Vyssoulis, Demosthenes B. Panagiotakos, Evangelos V. Economou, Marina G. Toutouza, Christodoulos Stefanadis, Pavlos K. Toutouza, Hippokration Hospital, University of Athens medical school, Athens, Greece

Background: Despite recent advances in our understanding of ischemia-induced angiogenic processes, the in situ formation of blood vessels from circulating endothelial progenitor cells or hemangioblasts (vasculogenesis) due to ischemia, remains an unsettled issue. Therefore, we investigated the role of granulocyte/macrophage colony stimulating factor (GM-CSF), a hematopoietic agent with vasculogenic properties, in acute myocardial infarction (AMI) patients (pts).

Methods: 29 pts with first attack of AMI admitted and thrombolysed during the acute phase, were examined for plasma levels of GM-CSF, measured by ELISA, and compared to 20 normal controls (NC) with mean values 3.15±0.28 pg/ml. All pts were divided in 2 sex and age-matched groups. Group A: 15 pts with minor AMI, E.F>45%. Group B: 14 pts with major AMI, E.F<45%.

Results: Data is expressed as mean values±S.E.M in pg/ml. For the statistical analysis the Wilcoxon test was used with α<0.05 compared to NC (P<0.001) and the relevant lowest value at 24h (A). Group A exhibited a slight non significant GM-CSF increase (3.92±0.83) at Oh, followed by a gradual decrease reaching a nadir at 24h (2.87±0.42) which was reversed leading to a late significant peak at 5d (10.72±1.93 *). In contrast, group B developed a significant initial peak (6.86±1.44 *) succeeded by a gradual decrease reaching a nadir at 24h (2.98±0.32) followed by a slight non significant peak at 7d (4.08±1.25).

Conclusions: All pts developed high initial GM-CSF levels, but only in group B this increase was significant compared to NC and the lowest plasma value at 24h. This early increase in group B may account for macrophage recruitment leading to macrophage-induced LV dysfunction in the early post-AMI period. A late GM-CSF-3rd peak at 5d is significant only in group A probably implying that vasculogenesis is enhanced, thus preserving LV function and exerting a cardioprotective potential, while it remains practically absent in pts with extensive AMI, thus resulting in LV decompensation.

Intracoronary Hyperoxic Blood Infusion Following Primary Percutaneous Coronary Intervention in Anterior Acute Myocardial Infarction Patients: Positive Effects on Cardiac Enzyme Kinetic, ST-Segment Changes, and Left Ventricular Function Recovery

Daniele Trabattoni, Franco Fabbiocchi, Pietro Montors, Giancarlo Marenzi, Alessandro Lodi, Paolo Ravagnani, Fabrizio Celeste, Stefano Gali, Luca Grancini, Antonio L. Bartorelli, Centro Cardiologico Monzino, University of Milan, Milan, Italy

Aim: To assess cardiac enzyme kinetic, ST-segment evolutionary changes and LV function recovery in primary PCI pts treated with intracoronary hyperoxic blood infusion and compare them with the results obtained in matched control pts.

Methods: We studied 41 pts treated for primary PCI for elevation anterior AMI. 21 pts (AO group) received hyperoxic blood (pO2: 760-1000 mmHg) which was selectively infused with the Therox AO system following ST-elevation myocardial infarction (STEMI). The remaining 20 pts (control group) had spontaneous normoxic blood autopulsion. The two groups were matched in clinical and angiographic characteristics at baseline. We compared the results obtained using 2D and echo- and no significant difference in time to presentation (AO group: 3.5±1.6 hrs; control group: 2.75±1.77 hrs) and maximum ST elevation (AO group: 6.2±3.6 mm; control group: 5.6±3.2 mm). LV function recovery was evaluated by serial 2-D echo (EF and WMSI) at 24 hrs, 7 days and 6 months in both groups.

Results: LAD revascularization (100% stenting) was successful in all pts. No difference was observed in CK peak levels between AO group (2308±211 IU/l) and control group (4024±2640 IU/l). However, AO group showed a 4.8±2.2 hrs shorter time to peak CK release (6.0±0.01) and a shorter CK half-life period (23.6±4.9 vs. 30.5±5.8 hrs; P=0.006) compared to the control group. Furthermore, AO group had more significant reduction of ST-segment elevation after LAD recanalization (5.2±0.8 mm vs. 0.95±2.2, P<0.002). Compared to baseline values, a significant mean relative improvement of LV function (%) EF at 24 hrs, 7 days and 6 months was observed only in AO pts (AO: 13.6%, 17.8% and 24.2%, respectively) while control pts did not show any significant change (2.4%-4.5% and 2.5%, respectively).

Conclusion: After successful primary PCI, cardiac enzyme kinetic and ST-segment evolutionary changes in AO treated pts suggest faster and more complete microvascular reperfusion. This may explain the significantly better LV function recovery in AO treated pts compared to controls.